

## LECTURE 1

### THE POST-TECHNOLOGICAL AGE

*Asngmt: Between Two Ages, UB; Principals and Principalities, CL*

Our designation for these seminars--"Education For a Post-Technological Age" may seem a bit presumptuous. We're not certain we're yet into a technological age, so to stake out a post-technological age is somewhat like the original sooners dashing across the prairies in their prairie schooners to make first claims on the choice sites, saying "I got here first." What is implied by the title is a recognition that students presently sitting in college classrooms are the people who will be in charge of society twenty to thirty years from the inescapable present. The education presented to them now must be preparation for that time --in some way must be a foretaste or a prophecy of what society will become and what it will need. It is a self-fulfilling prophecy, of course, because as these students nudge their way toward the seats of power they will be helping to shape the very society they are to rule.

How can we educate for a society we know will be different from the present? A brief look at history shows us a pattern of increasingly rapid *fundamental* social changes. By fundamental we refer to the elements that affect the way a culture regards itself (what it strives for, its way of doing things, what it thinks of as the essentials) A society reveals these underlying aspirations, as well as the necessities it confronts--in its economy, its domestic life, its arts and entertainment, its spirituality. And to get at these

elements, we have to begin with a basic question, *What manner of gainful employment engages the major portion of the population?* For work is the fundamental way in which people shape their lives: what kind of work they do determines much of the quality of their lives. This is what the Prometheus myth is about (which we shall be speaking of tomorrow): this myth depicts that moment in the "dark backward and abysm of time" when in a primordial age, human beings began to reflect on their daily occupations: it was then that tools were devised, that repetitive processes paved the way toward mastery of those processes. The Promethean gift of fire and of knowledge, set in motion in pre-history, have led toward an inevitable progress: when man *thinks*, he masters the *techne*, the arts of daily living.

Historically we characterize societies as those based on

- 1) hunting and gathering, 2) agriculture,
- 3) industry, and 4) technology.

Each overlaps the other--for instance, when agrarianism was giving way to industrialism, during the transition time a society based on craft and small entrepreneurship supplied the overlap. It was this emerging society, with its small stores and shops, its apparently unlimited opportunity for the small businessman, its farmland still rich and fertile, operated by prosperous farmers, that shaped the ethic of America. It is this stage in our society that Alexis De Toqueville observed and marvelled at in early nineteenth century (he published his *Democracy in America* in 1835); it is this small-town morality that we are still nostalgic about in America. (the whole

idea of there being unlimited opportunity for the ambitious young person) And it is this image and ethic that still attract immigrants to a "land of opportunity".

But this idyllic situation for enterprising young people is over; this pattern of life is gone forever, except as it entered into the American myth in terms of lasting qualities of character and imagination. Agrarianism was supplanted by the ugly reality of industrialism, which imprisoned large armies of laborers in the factory system and made slaves of its blue-collar workers. None of these economic stages are to be blamed; we cannot find a villain to indict for the inhumane features of much of industrialism. And what must be said in its favor is that it seems to be a *necessary* step in the development of a culture. What we have called the "third-world" countries are still in this stage of industrialism, requiring engineers and builders rather than ..... [thinkers and designers?]

Might it be possible that this present age of technology is also an overlap?--an intermediary stage between industrialism and its successor? Since we cannot know exactly what kind of society lies ahead of us--the unknown age that I'm calling *post-technological*--we don't know whether we are already into its beginnings or are caught still in the gap between two ages. It seems, however, that *automation* [rather than technology] fills the role of overlap--the bridge between industrialism and the new epoch. And automation clearly is part of industrialization, the age that

is just now ending. *Automation is not part of the new age.* With automation the actions of workers are imitated mechanically, robot-like, the same tasks performed, the same satisfactions served. [A good and comic example still present in our time is the paint mixer in a hardware store. It shakes the paint from side to side just as a human being would do--only faster. The same with an automatic ironer--except that it covers far more territory than the individual iron. The elevator that used to be operated by a person now runs itself; in printing shops, the platen press which, with automation, inks the platen, snaps the paper into place, presses the paper and platen together and snatches it out--all of which formerly had to be done by human hands.] In automation, then, the machine does precisely what the man has been doing. It is a robot. It makes no decisions, no judgements. [more examples] In a sense, then, the man doing these tasks has been a robot. Before the machine has relieved him of endlessly repetitive, unthinking tasks, he himself has been a kind of mechanism. When Norbert Wiener wrote his book on cybernetics back in the fifties, he entitled it "The Human Use of Human Beings" and even in that early time, in advance of the technological break-throughs that were to sweep through society in the sixties and seventies, he was predicting the use of robots to take over repetitive tasks. And we have to grant that automation has been a step forward for mankind. The economy had to readjust its practices, redefine its markets, move toward a global community. Automation demanded large industrial complexes and made capitalism

a favored financial system. {Shouldn't you mention the crisis of the mills?}

Fear of machines replacing manpower is of long standing; there were riots stirred by the printers' union when the linotype was introduced at the New York Tribune in 1868. But an expanding economy more than compensated for jobs lost to automation.

Automation asks "How can I make this product (or any of its parts) faster, more precisely, and with less human effort?" Some kind of machine is the obvious answer, and if various machines make different parts, then all the machines can feed an assembling machine automatically and we have the automated factory which needs human beings only as supervisors.

The automated factory is the triumph of industrialism and yet it heralds its demise. With few workers required, industry loses its political and social clout. The practical imagination turns in a different direction. And this is what has happened with technology. Technology is of a different order of ingenuity--a different level of imagination.. It doesn't imitate tasks; it doesn't imitate products that already exist. It aims directly at purposes--at desires--serving satisfactions by different routes and making possible new desires. With the technological imagination, the characteristic question turns from how do we do an assigned task to what do we want beyond what we can already get. Do we really want devices or do we want what the devices can do for us? Do we want card catalogs or do we want to know what books on our subject are

available -- or do we want, finally, the knowledge that is in those books? Do we want a Rolex watch or do we want to know what time it is?

Well of course our pride wants status symbols, some manifestation of having acquired goods in excess of our needs, or our neighbors means--and so perhaps the Rolex watch is not a good example! But stripped of superfluities there remains the bare structure of our basic needs. What technology does is look at the needs and not the structure. It frees us from the tyranny of things. The technological imagination couples with desire to see the form of existence that will be most satisfying to us and, in a burst of magnanimity, to our neighbor as well.. This is all getting a bit apocalyptic now, and we'd best delay it until we pick up the Promethean mind in the next two days.

I should warn you that the dictionary does not give such a grandiose picture of technology as I am presenting. It merely says "the science of practical arts," deriving from the Greek word techne, which is what Aeschylus's drama has Prometheus giving to mortals. We understand the significance of the term in our day: the *science of practical arts* and we have finally come to understand the power of those three words joined together: science, art, practical: Knowledge, making, for use. We understand technology in our day to mean the most advanced thinking that the human kind can muster, yielding new insights into the natural world which lead to devices of great practical importance.

It has been an *automated industrial economy* that we have been living in since World War II (we have entered the age of technology only in the last ten or fifteen years). In this automated industrial world, there is still a clear division between labor and administration--those who *do* and those who profit from those who do. The financial aspect of the economy (rather than the producing part) increasingly assumes control--Wall Street, the stock market, junk bonds, take-overs--and that leads to unstable political situations. And it has led, domestically, to an widening of the distance between rich and poor. The steadily increasing homeless members of our society are a quite visible sign of the extreme limits of this gap.)

The capitalism that grew up with industrialism and that for two centuries has fostered a higher standard of living for those within its system now obviously has the problem of changing its aims. The profit motive carried to extremes can no longer function in a moral and ethical way. We of the older generations leave to you younger ones the very serious problems of how to maintain a democracy not fettered by excessive constraints. What I am saying here is that the education needed will not be directed toward the production of technicians useful for the new technology--that will happen on its own through specialists and inspired amateurs like the present hackers-- and all of us will pick up techniques of usage incidentally just as we learn to drive a car, in the process of using devices as needed.

The major task of education will be the development of an ability in the general public for *quick learning* over a *broad scope* with true *understanding*--so that a person with broad knowledge may be quickly adaptable to new situations individually, with a philosophic capacity to participate wisely and imaginatively in a revised political community.

In these seminars, what we want to offer in the next several days is opportunities to dig deeper into our own consciousness and tap the sources of our own authority. That authority, we maintain, does not lie in the wealth of facts available in one's memory but in something else that we might call *wisdom*. Particularly in the time ahead, technology will make the facts one might need quickly available. Neither is wisdom a mere skill in handling algorithmic logic or sets of laws. Yes, wisdom takes time to accumulate, but wisdom is not a storehouse or a set of readily available files. There is always something original in active wisdom; the roots may tap many resources, but the flower is always fresh blown.

I'd like to think that I could present my own discipline, physics, for an experience of learning together here. It is the most philosophic of the sciences and it is a rich source of analogies. But it doesn't have as many handles sticking out for most people to grab hold of as does literature, say, and the wisdom it offers is not quite so general. I have found that my most apt students for physics are ones that also have good minds for literature. Louise and I thought it exceptionally fortunate that the imagination worked



so similarly in physics and poetry, but we discovered that adherents of all the disciplines think they share their resources with literature. It seems to be the universal solvent. So I shall ask one of its most adroit practitioners to present the rationale to you.